

Discovery and development of antibiotics was one of most important achievements of science and medicine in the 20th century, allowing saving lives of countless people. However, the widespread use and over-use of these precious compounds has lead to the situation, in which nowadays, in the 21st century, the phenomenon of antimicrobial resistance is more and more common, and threatens the possibility to successfully treat bacterial infections. This problem is especially evident in so-called hospital-acquired infections, more and more common nowadays. Certain bacteria, often non-pathogenic for healthy people, have become a threat for high-risk hospital patients, such as people with oncological problems or after transplantations.

Enterococci, ubiquitous colonizers of gastro-intestinal tract of humans and animals are an excellent example of such usually harmless bacteria, which currently become adapted to hospital conditions and represent a growing threat for patients in hospitals, causing infections of urinary tract and post-operative wounds, and even invasive infections, such as infections of the bloodstream (bacteraemia). In such cases, the efficient antibiotic treatment is crucial. Unfortunately, enterococci are not only naturally insensitive to several antibiotics but also relatively easily acquire resistance against drugs used in treatment of enterococcal infections. This phenomenon is especially frequent among enterococci circulating in hospitals and specialized to survive in this kind of setting. Antibiotic resistance is one of the important factors of this adaptation to hospital conditions.

Vancomycin is one of the most important drugs used in therapy of enterococcal infections in hospitals. The first vancomycin-resistant enterococci were observed in the half of 1980s. In Poland vancomycin-resistant enterococci appeared in the end of 1990s. Nowadays, vancomycin-resistant isolates account up to 40% of invasive isolates in the case of *Enterococcus faecium* in Polish hospitals, which ranks among the highest in Europe. Considering this worrisome development of epidemiological situation in our country, in the proposed project we aim to perform a detailed epidemiological analysis of vancomycin-resistant enterococci from the collection of the National Reference Centre for Susceptibility Testing. Isolates, selected for the analysis, carry the *vanB* resistance genes, typically located on so-called mobile genetic elements. These elements greatly facilitate further dissemination of vancomycin resistance to susceptible strains of enterococci. In our project we plan to use the most up-to-date genomic approaches, which will allow to establish relatedness of isolates, their relationships with strains and clones of enterococci present in other countries and to investigate the structure of mobile genetic elements carrying *vanB* genes in detail. We will also investigate the fitness cost, born by enterococci due to the acquisition of *vanB*-plasmids, which is highly relevant for survival and persistence of such organisms in the natural conditions. The realization of the project will constitute an important input into the enterococcal epidemiology, improving our knowledge and understanding of the phenomena related to antimicrobial resistance in hospitals.